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SALTING RIVER HERRING (ALEWIVES) IN CHESAPEAKE BAY

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River herring, or alewives, salted in the Chesapeake Bay area are caught in fish traps, locally called pound nets. A portion of the catch is brought to the processing plants in the boats used to fish the traps, if the distance is not too great. These fish reach the packing house in an average of five hours after they are caught. The remaining fish are brought in by "run boats." The load of one of these run boats or transportors includes fish obtained from nets at some distance from the saltery and the catches of a number of trap operators, each with a single net who are dependent on such boats to handle their catch. The fish brought in by run boats, as a rule, have been out of the water from a minumum of about 12 hours to a maximum of 24 hours. Under ordinary weather conditions, a salted product of good quality can not be prepared if the fish have been held longer than this time before salting, though should the weather be unusually cool, say between 40° to 50° F., the time in which the fish will remain in good condition may be extended to 36 hours.

The fish have been bought by count at a price averaging five dollars per thousand during recent years. They are unloaded from the hold of the transporting boat by bucket hoists. An occasional bucket is counted to establish the number of fish held by this container when it is filled level with the brim; and to determine the proportion of scrap fish.

The bucket is emptied into a hopper leading to a washer, which is usually a wire mesh "squirrel cage" drum, revolving in a tank of water. It both washes and scales the herring. The fish are carried by overhead conveyor from the washer to the cutting table. Details in cutting table construction differ from plant to plant, but a typical table

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Note.---This leaflet supersedes Memorandum S-353, issued by the former Bureau of Fisheries.

stands about 4 feet high, with a width of some 8 feet. It rises to a peak in the center, with a one foot slope to the sides. The fish fall from the conveyor onto the peak of the table, then slide down toward individual pens where they are cut.

Each workman is provided with a wire fish basket and an enamel or galvanized metal water bucket. The herring is grasped around the back near the head, and the workman makes a single curving cut, starting at the back of the head just behind the gills and continuing down the belly to the vent (anal opening). This removes head, viscera, and thin ventral flesh as one operation. The cut fish is thrown into the wire basket. If the herring contains roe, this is separated from the viscera and dropped into the galvanized bucket. If the cutting is not done carefully, some viscera may be left in the body cavity or the roe may be damaged by cutting. A large part of the cut roe is lost in canning as it drains away in washing. Cutting is done on a piecework basis, the worker being paid a certain price for each basket of cut fish or bucket of roe.

After being cut the fish are thrown into washing tanks. A typical tank is made of 2-inch pine planks and its dimensions are about 12 feet in length, by 6 feet in width, by 3 feet in depth. Some tanks are constructed with the bottom inclined about 30 degrees to one side, and a false bottom of slats, spaced one-half-inch apart, is placed in the tank at the top of the incline. Scales, viscera, and other waste material settle down in the deep angle of the bottom. Waste is drawn off with the wash water through flood gates. However, it is not as readily separated from the fish in an ordinary flat-bottomed washing tank, and additional time is lost in cleaning the tank.

The fish are stirred about in the water of the washing tank for a period of about 10 minutes. This greatly increases the efficiency of the washing process. Stirring is done mechanically by a paddlewheel arrangement in some plants, but hand labor is still used in a number of saltories. When the herring are sufficiently washed, they are scooped out of the tank by dip nets into slat cars holding about 1,200 fish and carried to the salting vats. Wheelbarrows with high sides are used for this purpose in a number of packing houses. Excess water drains away as the fish are carried to the vats. These are shallow wooden tanks, built of 2-inch Virginia pine, and are usually 10 feet in length by 6 feet in width and 3 in depth. Salt brine testing 100° by salinometer is poured into each tank to a depth of about 4 inches before loading with fish is started. As each load of fish is dumped into the brine, additional salt is added. The exact amount varies with the condition of the fish, and with the atmospheric humidity and temperature, but averages about 700 pounds to a tank. When full, a tank contains from 12,000 to 15,000 fish (about 4,000 pounds), and the brine should test from 95° to 98° by salinometer. The fish should be roused, that is stirred about, once each day while curing. After each rousing they are pressed down lightly in the tank and a thin layer of salt is scattered over the top. About 25 pounds of salt are added each time this is done.

Cut, or clipped, herring require an average time of nine days to cure. In fact this period is standard under Virginia packing regulations. Roe herring cured with only the heads removed must be salted 14 to 15 days. Strength of the brine is checked daily and should not test less than 90° by salinometer. If it falls below this, additional salt should be added.

Sufficiency of cure is determined first by the odor when the flesh is pulled from the backbone. The odor should be good and wholesome without suggestion of sourness. The flesh should be firm, but not excessively hard. The skin should be slightly, but not extremely, wrinkled, and the blood under the backbone should be dried.

When cured, the fish are taken from the tanks and piled in heaps to drain on the floor of the packing shed. Draining racks with a height of at least 6 inches above the floor are recommended. Herring should not be piled more than 18 inches high, but when space is at a premium, they have been piled to a depth of 3 feet. The fish should be drained at least 4 days and for not more than a week. The herring are then weighed or counted (weighing is more accurate) and packed in tight, heavy barrels. The fish are filled into the barrels in wheel-like tiers, that is, radiating from the center, with the first layer laid backs down, and all other layers with backs up.

A layer of three-quarter ground salt, is scattered over each tier of fish, using about 2½ pounds to the layer. A properly packed barrel should contain 160 pounds of fish and 50 pounds of salt with an average of 600 to 650 herring by count. The variation in count between barrels in any one lot must not be greater than fifty. The cured fish should measure not less than 6 inches if headless, or clipped, while whole fish should not measure less than 7½ inches. This cure is known as "tight pack."

Corned Herring.- The fish may be taken out of the tanks after they have been in brine from 12 to 48 hours. When this is done they are usually drained from 5 to 24 hours, although some packers do not drain the fish at all. The drained herring are packed in bushel baskets, with about 250 fish to a basket, and no salt is added. The baskets of fish are sold to grocers or hucksters throughout the countryside. This product is called corned herring and is a favorite springtime breakfast dish in the southeastern part of the United states.

A greater amount of fish is given the full 9-day cure, after which it is hauled in bulk to Richmond where it is placed in brine and held throughout the year in chill storage at 34° to 36° F. until it is sold as corned herring, though it is more heavily salted than the corned herring described previously. This pack answers the demand of the retailer for a smaller package, and it is brighter and more attractive in appearance than the tight pack, which it threatens to displace. Corned herring will remain in good condition from 10 days to 3 weeks in the hands of the retailer, the time depending on the length of cure, and on the temperature prevailing at the time.

Inspection.- A large part of the herring cured in Virginia is packed under a voluntary inspection system administered by the Division of Markets of the State Department of Agriculture. Under this system the packer agrees to maintain certain standards of pack. His fish is regularly examined by qualified inspectors while it is curing to insure that it is being properly cured. The inspectors keep complete daily records of temperature, salinity of brine, condition of fish, and any other factor which may affect the cure. The inspector is present when the cured fish are packed for shipment, to insure compliance with the accepted standards. If the pack is satisfactory, a grade certificate is issued to that effect, and the inspector stamps each barrel or other container with the official grade stamp.

The grades are as follows:

"Virginia No. 1 Herring - sahll consist of fish of one species, taken before spawning, fresh when curing begins, bright, free from rust at time of packing, of a sweet wholesome odor, thoroughly cured, well drained, with 80 percent of scales removed, and free from damage from any cause. All clipped roe fish shall have the heads properly removed. All roe fish shall have a fairely developed roe.

All cut fish shall be properly cut, thoroughly cleaned, and washed before curing begins.

Virginia Selects - shall consist of fish that meet all the grade and packing requirements of Virginia No. 1 and in addition shall, when clipped, have all membrane and blood removed from under the main bone. All roe fish shall have a well developed roe.

Unclassified - shall consist of fish which are not graded and packed in conformity with the foregoing grades."

This system has done much toward raising the quality of the Virginia pack, and to establish it as a high grade salt fish product.